

platinum film formed overlying a surface of a semiconductor substrate, wherein the layered interconnection structure includes the copper or platinum film and a neighboring film adjacent the copper or platinum film, the neighboring film being made of a material selected from a first group consisting of rhodium, ruthenium, iridium, osmium and platinum when the layered interconnection structure includes a copper film and the neighboring film is made of a material selected from a second group consisting of rhodium, ruthenium, iridium and osmium when the layered interconnection structure includes a platinum film, at least one of (a) the copper or platinum film and (b) the neighboring film being a film made by physical vapor deposition, the device further comprising a diffusion barrier layer, said neighboring film being sandwiched between said copper or platinum film and said diffusion barrier layer.

10. The semiconductor device according to claim 9, wherein the neighboring film is in contact with the copper or platinum film, and the diffusion barrier layer is in contact with the neighboring film.

11. The semiconductor device according to claim 9, wherein the layered interconnection structure includes the platinum film.

12. The semiconductor device according to claim 11, wherein the diffusion barrier layer is at least one film made

of material selected from the group consisting of titanium nitride, tungsten and tantalum.

13. The semiconductor device according to claim 11, wherein the platinum film is a film formed by physical vapor deposition.

14. The semiconductor device according to claim 11, wherein said neighboring film is a film formed by physical vapor deposition.

15. The semiconductor device according to claim 11, wherein both the neighboring film and the platinum film are films formed by physical vapor deposition.

16. The semiconductor device according to claim 9, wherein the layered interconnection structure includes the copper film.

17. The semiconductor device according to claim 16, wherein the diffusion barrier layer is at least one film made of material selected from the group consisting of titanium nitride, tungsten and tantalum.

18. The semiconductor device according to claim 16, wherein the copper film is a film formed by physical vapor deposition.

19. The semiconductor device according to claim 16, wherein said neighboring film is a film formed by physical vapor deposition.

20. The semiconductor device according to claim 16, wherein both the neighboring film and the copper film are films formed by physical vapor deposition.

21. ~~The semiconductor device according to claim 9, wherein the neighboring film is in contact with the copper or platinum film.~~

22. The semiconductor device according to claim 9, further comprising an insulating film overlying the layered interconnection structure and having a contact hole therethrough exposing the layered interconnection structure, the contact hole having an electrically conductive plug therethrough in electrical contact with the layered interconnection structure, and with another layered interconnection structure on the insulating film and electrically contacting the electrically conductive plug.

23. The semiconductor device according to claim 22, wherein the electrically conductive plug is a plug formed by physical vapor deposition.

24. The semiconductor device according to claim 22, wherein the another layered interconnection structure includes

a copper film or a platinum film and a further neighboring film between the plug and the copper or platinum film, said further neighboring film being made of a material selected from said first group when the another layered interconnection structure includes a copper film, and being made of a material selected from said second group when the another layered interconnection structure includes a platinum film.

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25. The semiconductor device according to claim 24, further comprising another diffusion barrier layer between the plug and the further neighboring film.

26. The semiconductor device according to claim 25, wherein the another diffusion barrier layer is at least one film made of material selected from the group consisting of titanium nitride, tungsten and tantalum.

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27. A semiconductor device having a layered interconnection structure including a copper film formed overlying a surface of a semiconductor substrate, wherein the layered interconnection structure includes the copper film and a neighboring film adjacent the copper film, the neighboring film being made of a material selected from a group consisting of rhodium, ruthenium, iridium, osmium and platinum, at least one of (a) the copper film and (b) the neighboring film being a film made by physical vapor deposition.